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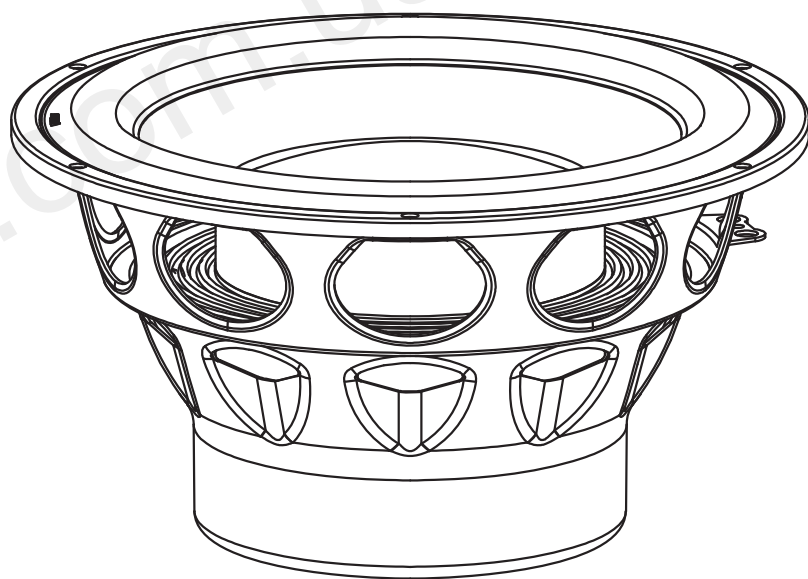
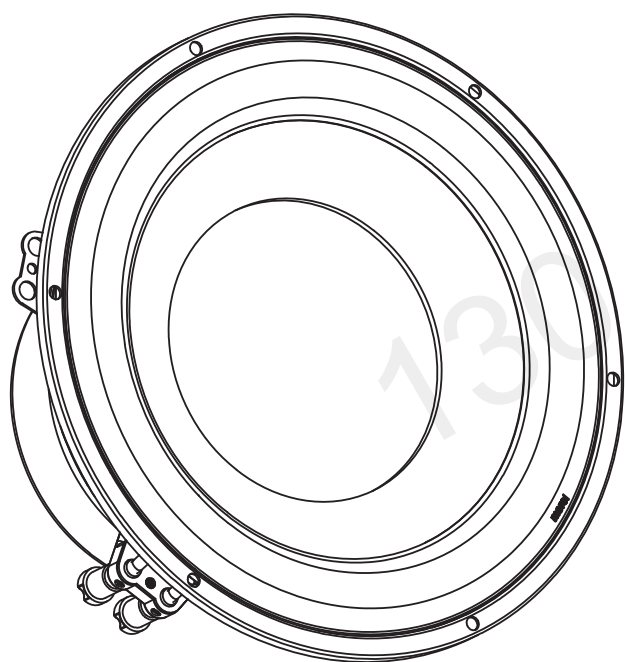
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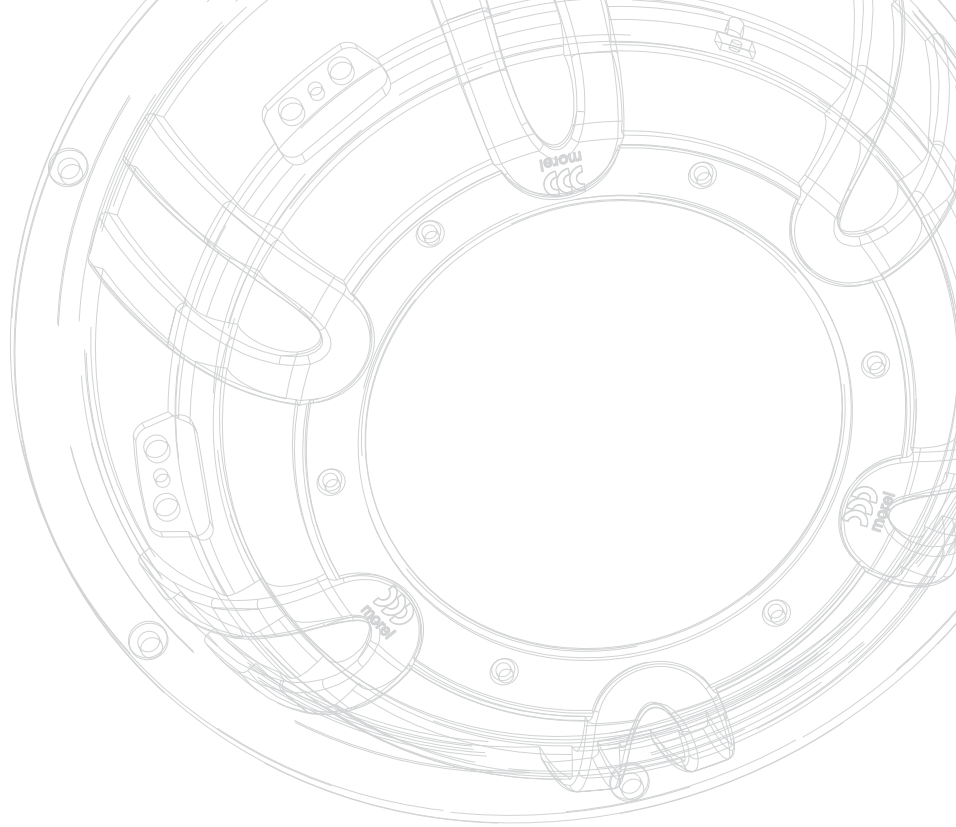
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# ULTIMO SUBWOOFER SERIES

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## OWNERS MANUAL





## Introduction

Dear Valued customer,

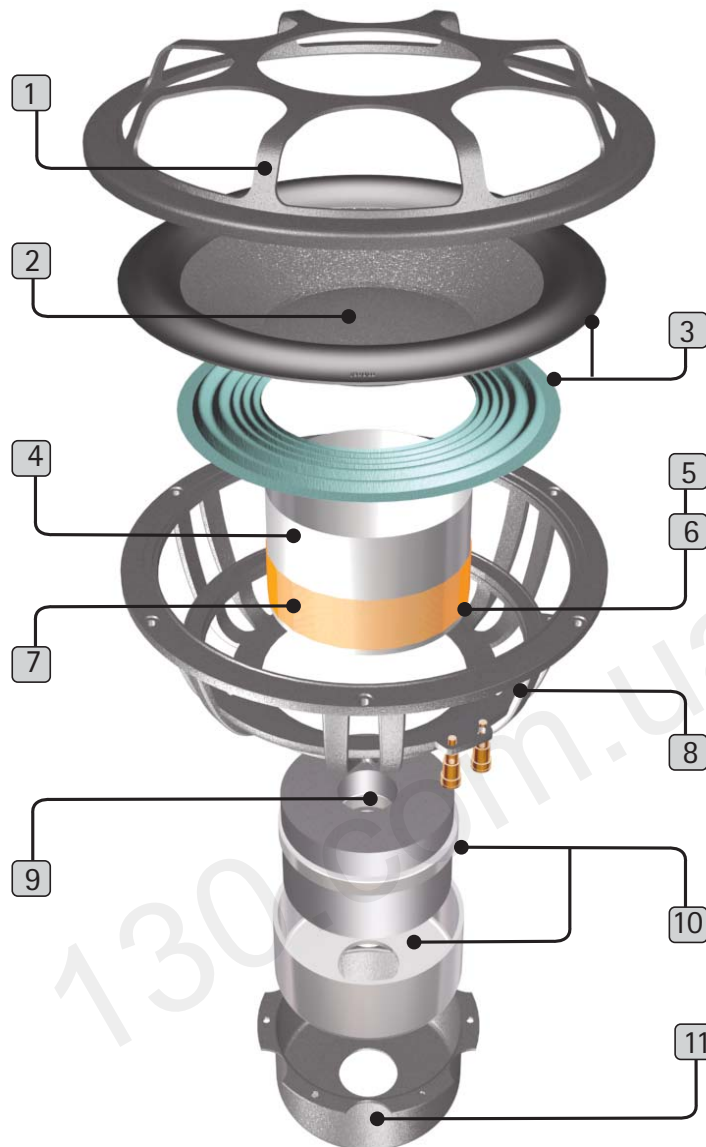
Thank you for choosing Morel's Ultimo subwoofer to satisfy your demanding car audio standards. After years of engineering and manufacturing Morel's trademark full range speakers, the time has come to engineer a line of subwoofer masterpiece.

Consistent with Morel's philosophy, this handcrafted subwoofer will satisfy those who like to "crank it up". The new Ultimo represents an extraordinary combination of audiophile bass quality, high power handling and ease of installation.



# Technological features

Morel's Ultimo is the ultimate in subwoofer technological innovation and performance. Designed to perform as well in sealed or ported enclosures, the ultomo's gigantic 5.1" (130mm) Hexatech™ voice coil delivers powerful, accurate, dynamic, and musical bass notes.



## 1. Octopus Grille

innovative design to provide protection and maintain acoustic transparency.

## 2. One piece Hybrid Cone

An integrated cone made from a composite of paper and carbon fiber for improved musicality, power handling and low distortion.

## 3. PFS™

Progression field symmetry engineering for longer linear excursion and optimized performance at high power output.

## 4. Black Aluminum Former

Thick and durable aluminum former with ultra high thermal limit properties for long-lift performance.

## 5. External Voice Coil

A gigantic 5.1 voice coil for improved cone support and high power handling.

## 6. Accucenter™

Self-centering engineering for easy voice coil repair.

## 7. Hexatech™ Aluminum Voice Coil

For minimal loss of magnetic flux and low induction for improved efficiency.

## 8. Uniflow™

Aluminum die-cast chassis to eliminate unwanted vibration noise and for increased durability.

## 9. Cooling Duct

Enables air cooling circulation for thermally stable operation of the voice coil.

## 10. DMM™

optimized and compact Double Magnet Motor that achieves 90% efficiency.

## 11. Magnet Cup enclosure.

Heavy-duty enclosure, engineered to attach to the Uniflow™ chassis, enables quick and easy replacement of the magnet motor and cone coil assembly if necessary.

# Choosing the correct enclosure

Enclosure selection depends both on the environment and on the desired performance. The power input and size of the vehicle play an important role in correctly installing the subwoofer, as does the preferred bass experience.

The Ultimo and Ultimo SC subwoofers are designed to work optimally in both ported and sealed enclosures however, each of these enclosure type will produce a slightly different sounding result.

As a rule of thumb, the bigger the enclosure, the lower the bass frequency response will be but it will have less control and definition. On the contrary, as the enclosure volume gets smaller, the bass frequency response is higher, but the bass reproduction is faster and tighter. For those of you who are looking to get optimal SQ result, we highly suggest to use sealed enclosures; for those who are seeking high SPL, we suggest using ported enclosures. The table below specifies the required volume range needed for the Ultimo series to produce best results in both sealed and ported enclosures.

## Ported (Bass reflex) enclosures

Ported enclosures have a circular or rectangular tube or duct leading to an opening in the enclosure structure. If tuned properly, a ported enclosure enables greater bass extension from a smaller enclosure, as well as better power handling, efficiency, control and faster bass reproduction.

## Sealed enclosures

These completely sealed enclosures are not affected by air pressure changes inside the enclosure due to cone movement. Acoustic suspension and cone movement linearity are improved, resulting in lower distortion and higher power levels. The drawbacks of the sealed enclosures are lower efficiency due to power absorption inside the enclosure, and reduced transient response at lower frequencies. In conclusion, sealed enclosures provide powerful bass reproduction and excellent dynamics with extremely low distortion.

## Morel's recommended enclosure volumes for ported and sealed enclosures

	ULTIMO 8	ULTIMO 10	ULTIMO 12
Ported Enclosure	10-15 lit (0.353-0.529 cu.ft) Optimal performance at 10 lit (0.353 cu.ft)	18-40 lit (0.635-1.412 cu.ft) Optimal performance at 30 lit (1.059 cu.ft)	25-60 lit (0.882-2.11 cu.ft) Optimal performance at 45 lit (1.589 cu.ft)
Sealed enclosure	6.5-15 lit (0.222-0.529 cu.ft) Optimal performance at 10 lit (0.353 cu.ft)	12-45 lit (0.423-1.589 cu.ft) Optimal performance at 25 lit (0.882 cu.ft)	20-60 lit (0.706-2.11 cu.ft) Optimal performance at 30 lit (1.059 cu.ft)

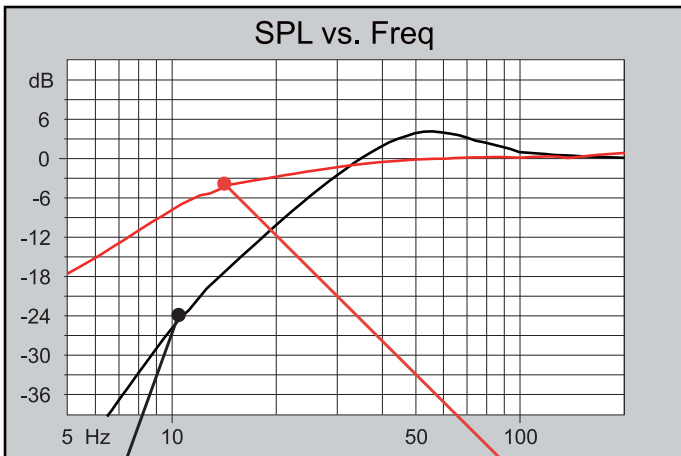
  

	ULTIMO SC 10	ULTIMO SC 12
Ported Enclosure	19-40 lit (0.67-1.412 cu ft) Optimal performance at 29 lit (1.024 cu.ft)	30-60 lit (1.059-2.11 cu.ft) Optimal performance at 45 lit (1.58 cu.ft)
Sealed enclosure	13-30 lit (0.459-1.059 cu.ft) Optimal performance at 15 lit (0.529 cu.ft)	20-50 lit (0.706-1.76 cu.ft) Optimal performance at 28 lit (0.988 cu.ft)

The following graphs simulate the Ultimo and Ultimo SC subwoofers optimal performance in ported and sealed enclosures. These guidelines will enable you to choose the best option suited for you. Please note: the recommended enclosure sizes specified include driver displacement.

# Ultimo & Ultimo SC ported and sealed enclosure graphs

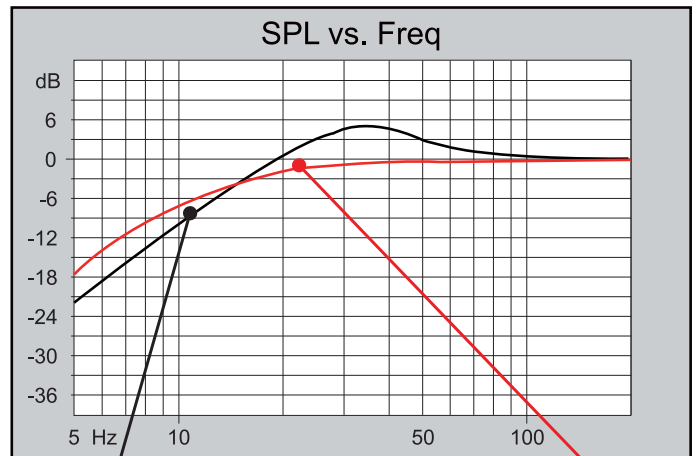
## ULTIMO 8



FB = 48 Hz  
 VB = 10 Lit (0.353 cu.ft)  
 Port=  $\varnothing$  2"x9.16" long  
 ( $\varnothing$ 5.1x23.3 cm)

Q = 0.62  
 VB= 10 Lit (0.353 cu.ft)

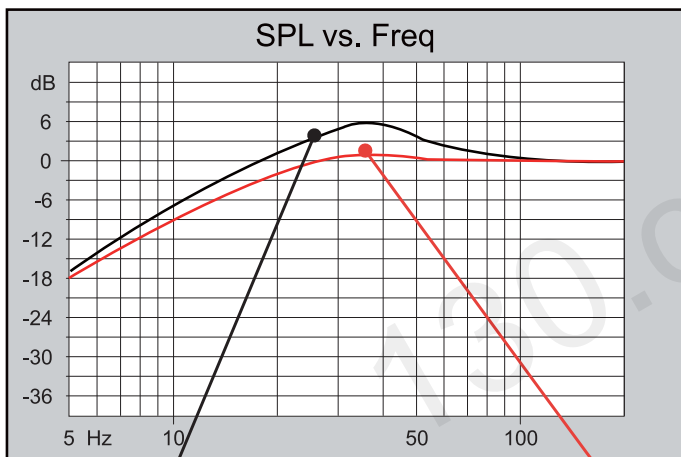
## ULTIMO 10



FB = 34 Hz  
 VB = 30 Lit (1.05 cu.ft)  
 Port=  $\varnothing$  3"x12.9" long  
 ( $\varnothing$  7.6x33 cm)

Q = 0.707  
 VB= 25 Lit (0.88 cu.ft)

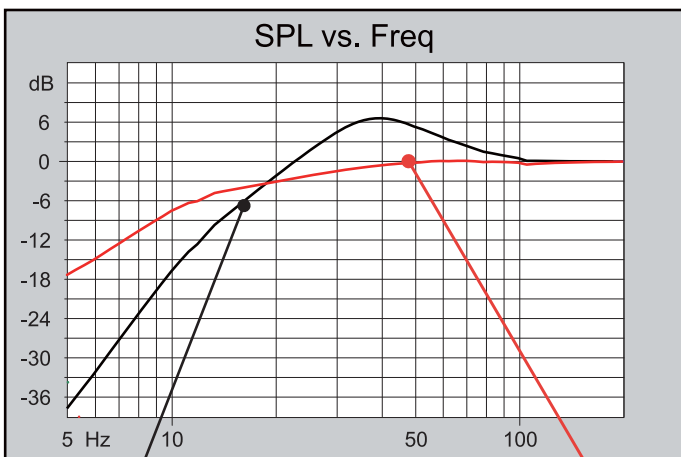
## ULTIMO 12



FB = 33 Hz  
 VB = 45 Lit (1.58 cu.ft)  
 Port=  $\varnothing$  4"x16" long  
 ( $\varnothing$ 10.6x41 cm)

Q = 0.7  
 VB= 35 Lit (1.2 cu.ft)

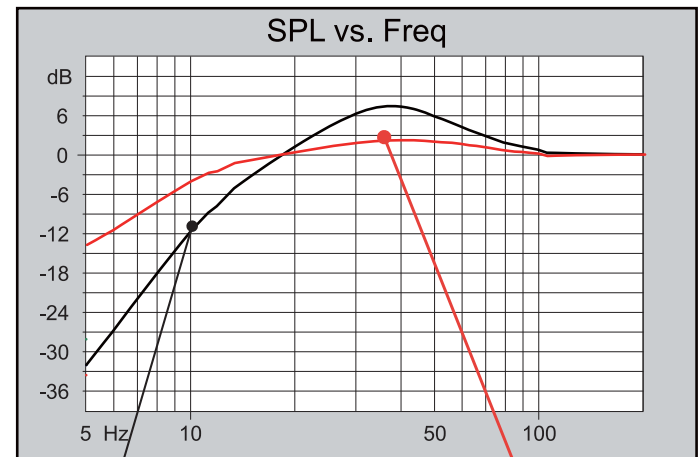
## ULTIMO SC10



FB = 35 Hz  
 VB = 29 Lit (1.02 cu.ft)  
 Port=  $\varnothing$  3"x13.2" long  
 ( $\varnothing$  7.6x33.6 cm)

Q = 0.71  
 VB= 15 Lit (0.529 cu.ft)

## ULTIMO SC12



FB = 31 Hz  
 VB = 45 Lit (1.58 cu.ft)  
 Port=  $\varnothing$  3"x10.3" long  
 ( $\varnothing$ 7.6x26 cm)

Q = 0.71  
 VB= 28 Lit (0.98 cu.ft)

# Connecting the Ultimo subwoofer

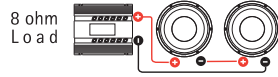
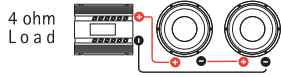
The Ultimo subwoofers may be connected to your amplifier in a variety of configurations, as suggested below.

## Series connection (1–3 woofers)

Ultimo 2 ohm version



Ultimo 4 ohm version

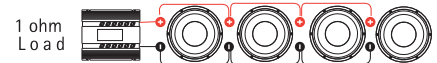
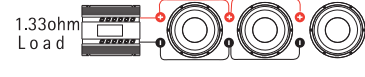


## Parallel connection (2–4 woofers)

Ultimo 2 ohm version



Ultimo 4 ohm version



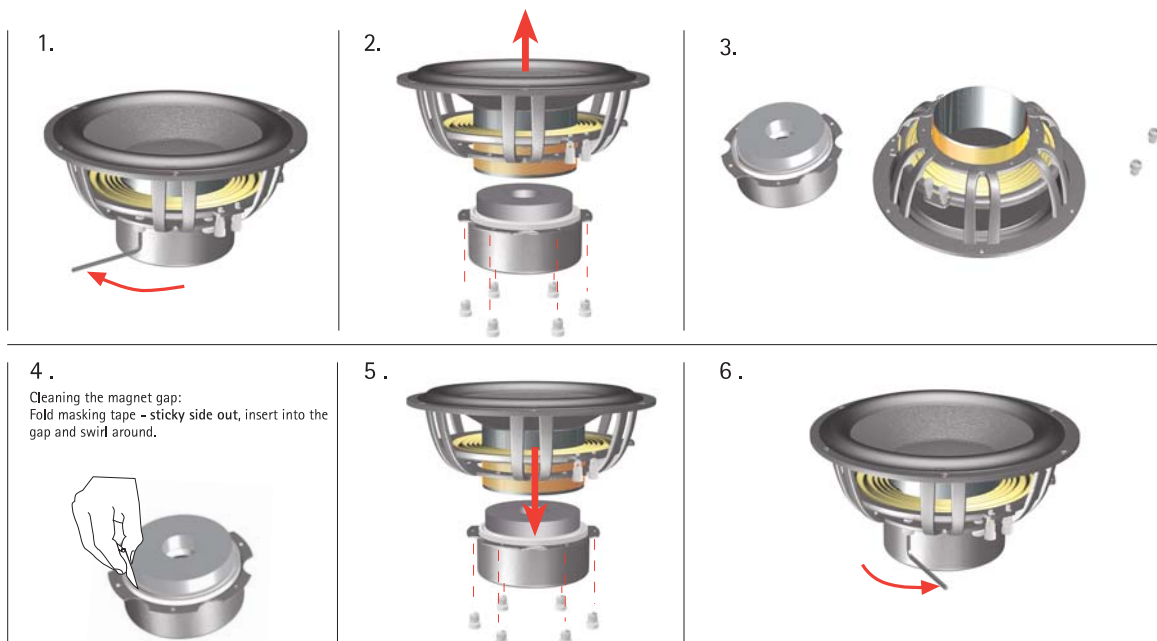
## Tuning recommendation

Once the proper enclosure has been constructed, Please follow these tips to optimize the performance of your new Ultimo subwoofer. It is always suggested to consult your Authorized Morel Dealer for more specific guidance, If necessary.

1. Set your gain level control to ensure stable amplifier operation without distortion or saturation to prevent subwoofer damage.
2. Adjust the cut-off frequency according to the enclosure design and subwoofer specifications to ensure optimal performance.
3. Electronic acoustic corrective filters (e.g. equalizer) are not required, as long as the subwoofer enclosure is designed properly.
4. After listening to the subwoofer you may choose to invert the phase inverting the phase will affect the acoustic performance of the subwoofer. it is recommended to listen in both configurations in order to determine your preferred mode.
5. Before adjusting your sound system further, it is suggested to move the subwoofer enclosure to different locations in the car trunk. Placing the enclosure in different locations may provide the solution you seek.

## Cone replacement procedure

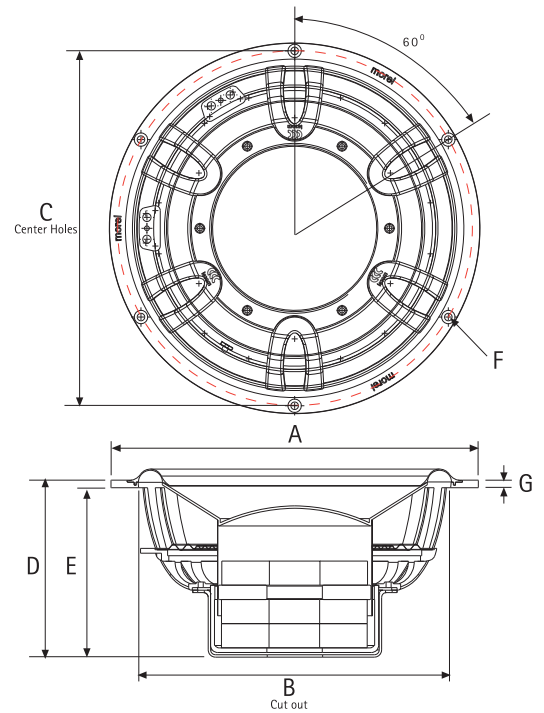
The Ultimo subwoofer was designed using Morel's Trademark Accucenter™ technology, which enables easy, quick replacement of a damaged voice coil cone assembly by simply dismantling the magnet motor system and bolting it to a new chassis and cone assembly. Please carefully follow the instructions below.



## ULTIMO SPECIFICATIONS

General data	ULTIMO 8		ULTIMO 10		ULTIMO 12	
	2 Ohm	4 Ohm	2 Ohm	4 Ohm	2 Ohm	4 Ohm
Overall Dimensions	DxH 222mm (8.74") X 120 mm (4.72")		263mm (10.35") X 140.3mm (5.52")		305mm (12") X 146.9 mm (5.78")	
Power Handling RMS	800 W		1000 W		1000 W	
Transient power 10ms	3000 W		3000 W		3000 W	
Sensitivity 2.83Vrms/1M	91.5 dB		87.4 dB		88 dB	
Sensitivity 1W/1M	84dB		83.5 dB		84.5 dB	
Frequency Response	20-900 Hz		10-900 Hz		10-900 Hz	
Cone Material	Carbon-fiber laminated paper		Carbon-fiber laminated paper		Carbon-fiber laminated paper	
Net Weight	6.1 Kg. (13.44 lb)		6.5 Kg. (14.3 lb)		6.7 Kg. (15 lb)	
Driver displacement	2.0 Lit (0.07 cu.ft)		2.34 Lit (0.08 cu.ft)		2.6 Lit (0.09 cu.ft)	
<b>Voice Coil and Magnet Parameters</b>						
Voice Coil Diameter	130 mm (5.1")		130 mm (5.1")		130 mm (5.1")	
Voice Coil Height	37mm (1.45")		37mm (1.45")		37mm (1.45")	
Voice Coil Former	Aluminum		Aluminum		Aluminum	
Voice coil wire	Hexatech Aluminum		Hexatech Aluminum		Hexatech Aluminum	
Number of layers	2		2		2	
Max. Linear excursion	X ± 12.5 mm (0.5") (Each way)		± 12.5 mm (0.5") (Each way)		± 12.5 mm (0.5") (Each way)	
Magnet system type	Double magnet vented		Double magnet vented		Double magnet vented	
HE-Magnetic gap height	HE 12mm (0.5")		12mm (0.5")		12mm (0.5")	
B flux density	B 0.64 T		6.4 T		6.4 T	
BL product	BXL 7.1 NA 12 NA		13.0 TM		13.0 TM	
<b>Electrical Data</b>						
Nominal Impedance	Z	2.0 Ohm	4.0 Ohm	4.0 Ohm	2.0 Ohm	4.0 Ohm
DC Resistance	RE	1.7 Ohm	3.7 Ohm	3.7 Ohm	1.7 Ohm	3.7 Ohm
Voice Coil Inductance @ 1KHz	LBM	0.30 MH	1.0 MH	1.0 MH	0.30 MH	1.0MH
<b>T-S Parameters</b>						
Suspension Compliance	CMS	0.17	0.17	0.22	0.22	0.40
Mechanical Q Factor	QMS	1.43	1.62	1.712	1.86	1.72
Electrical Q Factor	QES	0.62	0.58	0.55	0.58	0.46
Total Q Factor	QTS	0.43	0.43	0.42	0.40	0.345
Mechanical Resistance	RMS	15.4	14.5	13.9	21.9	14.2
Moving Mass	MMS	85 gr.	95 gr.	128 gr	121 gr.	143 gr.
Resonant Frequency	FS	41 Hz	40 Hz	29 Hz	30 Hz	20 Hz
Eq. Cas Air Load (liters)	VAS	14 Lit(0.4944 cu.ft)		34.5 Lit (1.22 cu.ft)		105 Lit(3.71 cu.ft)
Effective Piston Area	SD	0.0243 m <sup>2</sup>		0.03 m <sup>2</sup>		0.0471 m <sup>2</sup>

## Overall Dimensions

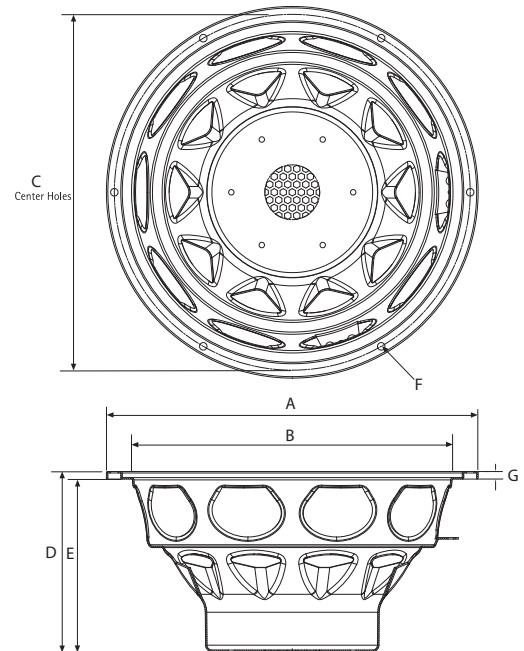


	ULTIMO 8	ULTIMO 10	ULTIMO 12
A	Ø 8.74" (222mm)	Ø10.35" (263mm)	Ø12" (305mm)
B	Ø 7.87" (200mm)	Ø9.13" (232mm)	Ø10.62" (270mm)
C	Ø 8.38" (213mm)	Ø9.96" (253mm)	Ø11.496" (292mm)
D	4.68" (119mm)	5.52" (140.3mm)	5.78" (146.9mm)
E	4.48" (114mm)	5.27" (134mm)	5.53" (140.69mm)
F	Ø 0.188" (4.8mm)	Ø0.244" (6.2mm)	Ø0.244" (6.2mm)
G	Ø 0.19" (5mm)	Ø0.25" (6.3mm)	Ø0.25" (6.3mm)

## ULTIMO SC SPECIFICATIONS

General data	ULTIMO SC 10		ULTIMO SC 12		
	2 Ohm	4 Ohm	2 Ohm	4 Ohm	
Overall Dimensions	DxH 263mm (10.35") X 143 mm (5.63")		305mm (12") X 151.5 mm (5.96")		
Power Handling RMS	600 W		600 W		
Transient power 10ms	2000 W		2000 W		
Sensitivity 2.83Vrms/1M	95 dB		91.5 dB		
Sensitivity 1W/1M	87 dB		86.5 dB		
Frequency Response	10-900 Hz		10-900 Hz		
Cone Material	Carbon-fiber laminated paper		Carbon-fiber laminated paper		
Net Weight	6.1 Kg. (13.44 lb)		6.2 Kg. (13.66 lb)		
Driver displacement	2.34 Lit (0.08 cu.ft)		2.6 Lit (0.09 cu.ft)		
<b>Voice Coil and Magnet Parameters</b>					
Voice Coil Diameter	130 mm (5.1")		130 mm (5.1")		
Voice Coil Height	31mm (1.2")		31mm (1.2")		
Voice Coil Former	Aluminum		Aluminum		
Voice coil wire	Hexatech Aluminum		Hexatech Aluminum		
Number of layers	2		2		
Max. Linear excursion	X ± 9.5 mm (0.37") (Each way)		9.5 mm (0.37") (Each way)		
Magnet system type	Double magnet vented		Double magnet vented		
HE-Magnetic gap height	HE 12mm (0.47")		12mm (0.47")		
B flux density	B 6.4 T		6.4 T		
BL product	BXL 6.75 T.M 11 T.M		6.75 T.M 11 T.M		
<b>Electrical Data</b>					
Nominal Impedance	Z	2.0 Ohm	4.0 Ohm	2.0 Ohm	4.0 Ohm
DC Resistance	RE	1.3 Ohm	3.0 Ohm	1.3 Ohm	3.0 Ohm
Voice Coil Inductance @ 1KHz	LBM	0.27 MH	0.85 MH	0.27 MH	0.85 MH
<b>T-S Parameters</b>					
Suspension Compliance	CMS	0.25	0.3	0.45	0.42
Mechanical Q Factor	QMS	1.8	1.84	1.73	1.93
Electrical Q Factor	QES	0.49	0.43	0.45	0.41
Total Q Factor	QTS	0.38	0.35	0.36	0.34
Mechanical Resistance	RMS	10.86	9.97	8.7	8.45
Moving Mass	MMS	91.6 gr.	101.7 gr.	103.2 gr.	112.2 gr.
Resonant Frequency	FS	33 Hz	29 Hz	23 Hz	23 Hz
Eq. Cas Air Load (liters)	VAS	42 Lit(1.48 cu.ft)	50 Lit(1.77 cu.ft)	121 Lit(4.27 cu.ft)	113 Lit(4.0 cu.ft)
Effective Piston Area	SD	0.0346 m <sup>2</sup>		0.0471 m <sup>2</sup>	

## Overall Dimensions



	ULTIMO SC 10	ULTIMO SC 12
A	Ø10.35" (263mm)	Ø12" (305mm)
B	Ø 8.87" (225.15mm)	Ø10.35" (263mm)
C	Ø 9.96" (253mm)	Ø 11.5" (292mm)
D	5.63" (143mm)	5.96" (151.5mm)
E	5.38" (136.6mm)	5.72" (145.3mm)
F	Ø0.244" (6.2mm)	Ø0.255" (6.5mm)
G	Ø0.267" (6.8mm)	Ø0.255" (6.5mm)



**Wishing you many years of sound enjoyment!**

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**Warning**

We care about your hearing!!! Morel's Ultimo series is capable of producing sound levels that can permanently damage your hearing! Turning up a system to a level that has audible distortion is more damaging to your ears than listening to an undistorted system at the same volume level. Please use common sense and precaution when using your sound system.